

SECTION 01515

TEMPORARY WATER

1.0 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Water Lines: Section 02660

1.2 DESCRIPTION OF SYSTEM

A. The Contractor shall make arrangements for and provide all necessary facilities for water supply at his own expense, unless otherwise provided.

1.3 COSTS

A. Pay costs of temporary water services, including costs of installations, maintenance and removal of facilities.

B. If the Owner is a water purveyor, water for filling, testing and flushing of the new pipelines may be available from the existing water distribution system at no cost to the Contractor after obtaining prior permission from the Owner.

C. If the Owner is not a water purveyor, the Contractor may secure water from any suitable source. If the Contractor purchases water from a water utility at a fire hydrant on or near the project, all arrangements shall be made by him at his own expense and payment be made to the utility in accordance with their rate schedule.

2.0 PRODUCTS

2.1 MATERIALS

A. Materials may be new or used but must be adequate for purpose required, sanitary and must not violate requirements of applicable codes.

3.0 EXECUTION

3.1 GENERAL REQUIREMENTS

A. The water utility shall be contacted to determine if sufficient water is available at the particular time before any use.

B. Flushing overnight or excessive wasting will not be permitted.

C. The Contractor shall use only those hydrants designated by the agency in charge of water distribution and in strict accordance with its requirements for hydrant use.

- D. The Contractor shall use hydrant wrenches only in open hydrants. He shall also make certain that the hydrant valve is open "full", since "cracking" the valve causes damage in the valve. An approved auxiliary valve shall be provided on the outlet line for control purposes. Fire hydrant valves must be closed slowly to avoid a surge in the system which creates undue pressure on the water lines. The Contractor shall carefully note the importance of following these directions.
- E. If one of the Contractor's employees shall knowingly or unknowingly use the wrong wrench on a hydrant and thereby damage the hydrant valve stem, the Contractor will be responsible. He shall immediately notify the water utility so that the damage can be repaired as quickly as possible.
- F. Upon completing the use of the hydrants, the Contractor shall notify the water distribution agency, so that the hydrants may then be inspected for possible damage. Any damage resulting from the use of the hydrants by the Contractor will be repaired by the water agency and the cost thereof shall, if necessary, be withheld from the final payment to the Contractor.
- G. The Contractor shall furnish all connectors, wrenches, valves, and small tools that may be necessary to meet the requirements of the water distribution agency pertaining to hydrant use.
- H. Violation of these requirements will result in fines and will lay the Contractor liable for damage suits because of malfunctioning of damaged fire hydrants, in the event of fire or other emergencies.

3.2 REMOVAL

- A. Completely remove temporary materials and equipment upon completion of construction.

*** END OF SECTION ***

SECTION 01545

PROTECTION OF WORK AND PROPERTY

1.0 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Temporary Controls: Section 01560
- B. Pavement Repair and Resurfacing: Section 02575
- C. Existing Utilities/Facilities - Underground and Overhead: Section 02760
- D. Landscape Restoration: Section 02980

1.2 PUBLIC AND PRIVATE PROPERTY

- A. The Contractor shall protect and maintain all underground or aboveground utilities and structures affected by the work and all lawns, shrubs, trees, fences, rockeries, etc., and parking strips or private property crossed by or adjacent to his operation, and any damage shall be repaired and restored by the Contractor to the satisfaction of the Owner.
- B. The Contractor will be responsible for all damage to roads, highways, ditches, bulkheads, walls, bridges, culverts, utilities, barricades, lights, or other property, caused by the work, whether such damage be at the site of the work or caused by transporting or hauling to or from the work; and he shall repair or replace, or arrange for the repair or replacement of all such damage to the satisfaction of the Owner. Any material damaged by the Contractor's operations shall be replaced with new material.
- C. Whenever construction work under this Contract is undertaken on easement, right-of-way, or franchise, all work shall be confined to the limits of such easement, right-of-way, or franchise, and accomplished so as to cause the least amount of disturbance and a minimum amount of damage.
- D. Completion of work across private property shall be carried out in one continuous operation of construction of the facilities with the immediate restoration and cleanup of the construction area. If the Contractor fails to perform such construction and restoration continuously as herein provided, the Owner may give the Contractor a written notice to so perform, and in event of failure by the Contractor to complete such construction and restoration within 72 hours of such notice, the Owner may complete the installation and restoration on such private property to the extent the Owner deems advisable and the cost of all work, labor, materials, and expenses incurred by the Owner in so doing shall be paid by the Contractor and may be deducted from any monies due or to become due, the Contractor.
- E. Particular care shall be exercised to see that the topsoil from the trench is preserved and replaced in its original location. It shall be the Contractor's responsibility to strip such topsoil from the trench, or construction area, and stockpile it in such a manner that it may be replaced,

by him, upon completion of construction.

- F. Wherever it may be necessary for the Contractor to trench through any lawn areas, the sod shall be carefully cut and rolled and replaced after ditches have been water settled, or otherwise properly compacted. All work shall be done in a manner calculated to leave the lawn area clean of earth and debris and in a condition as near as possible to that which existed before work was started.
- G. The Contractor shall not remove, even temporarily, any trees or shrubs which exist on easements across private property or in parking strips, without first having notified the property owners or authorities maintaining same.
- H. Ornamental trees and shrubbery shall be carefully removed with the earth surrounding their roots, wrapped in burlap and replanted in their original positions within 48 hours. Ornamental trees or shrubbery destroyed, or damaged, by the Contractor, whether on public or private property shall be replaced by the Contractor with material of equal quality, and no additional compensation will be allowed for such replacement.
- I. It is expressly understood that the Contractor shall in particular restore all such easements and rights-of-way to a condition equal to its original condition and in a condition satisfactory to the property owners and the Engineer. It is also understood that any private improvements made in public rights-of-way are included in the above category.

1.3 TREES

- A. All existing trees and shrubs which are to be protected and are damaged during construction shall be trimmed or replaced by the Contractor or a certified tree company under permit from the jurisdictional agency or owner and to the satisfaction of said agency and/or owner.
- B. The Contractor shall immediately notify the Engineer and jurisdictional agency and/or owner if any tree which is to be protected is damaged by his operations. If, in the opinion of said agency or the owner, the damage is such that replacement is necessary, the Contractor shall replace the tree at his own expense.
- C. Replacement trees shall be of a like size and variety as the tree damaged, or, if of a smaller size, the Contractor shall pay to the owner of said tree a compensatory payment acceptable to the tree owner not to exceed the cost of replacing the tree as determined from quotes obtained by the tree owner from a minimum of two local nurseries. The size of the replacement trees shall be not less than 1-inch diameter nor less than 6 feet in height.
- D. When trimming is permitted, symmetry of the tree shall be preserved. No stubs or splits or torn branches shall be left. Clean cuts shall be made close to trunk or large branch. Spikes shall not be used for climbing live trees. All cuts over 1-1/2 inches in diameter shall be coated with an asphaltic emulsion material.

1.4 EASEMENTS

- A. Reference numbers of easements are shown on drawings.
- B. The Contractor shall meet and fulfill all covenants and stipulations of each easement obtained by the Owner for this project.
- C. Copies of all easements and special covenants are on file in the office of the Owner, which is incorporated in this Contract by this reference, as if set forth herein in full.

1.5 ACQUISITION OF EASEMENTS

- A. The Owner has obtained or is in the process of obtaining the easements required for this project.
- B. If at the time of Bids on this Contract, the Owner has not obtained all of the easements, it is anticipated that there may be additional stipulations and covenants on the remaining easements. It is also anticipated that the Owner may purchase certain items on easements, such as large trees within the permanent easement, thereby relieving the Contractor from the responsibility of restoring or protecting same. All bidders shall base their bids upon full restoration of all property within the easements unless otherwise specifically stated.

1.6 COVENANTS ON EASEMENTS NOT LISTED

- A. Upon completion of obtaining the remaining easements, if any, the Owner and the successful Bidder will negotiate a Change Order to the Contract for any additional stipulations not payable under a unit bid price under this Contract.
- B. Work shall not be started on any private right-of-way or easement until clearance is given the Contractor by the Engineer.

1.7 EASEMENT RELEASE

- A. Where work is done on easements the Contractor shall obtain a written statement (see following form) of satisfactory restoration from each property owner involved, and furnish a copy of said statement to the Engineer. The statement will be required before the work will be accepted by the Owner, provided, however, that where the Contractor contends that the property owner is making unreasonable demands, he shall submit a list of such demands to the Engineer in writing. If in the opinion of the Engineer, such demands are unreasonable, the Engineer shall so notify the Owner and if the Owner approves, the Contractor may be excused from the necessity of obtaining a written statement of satisfactory restoration from the property owner making such unreasonable demand.

EASEMENT NO. _____

CONTRACT NO. _____

PROPERTY OWNER'S APPROVAL OF EASEMENT RESTORATION

I

We, the undersigned owner(s) of property identified as

(Address or Property Description)

do hereby approve and accept the restoration work done by

the Contractor on the construction of pipelines on easements over
and across my (our) property.

SIGNED _____

DATE _____

1.8 CARE OF EXISTING FACILITIES

- A. The Contractor shall take adequate precautions to protect existing sidewalks, curbs, pavements, utilities, adjoining property, and structures, and to avoid damage thereto, and he shall at his own expense completely repair any damage thereto caused by his operation.
- B. Access for fire fighting equipment shall be maintained at all times.

1.9 SHORING, BRACING, ETC.

- A. The Contractor shall shore up, brace, under-pin, and protect as may be necessary, all foundations and other parts of all existing structures adjoining the site of the Project, which are in any way affected by the excavation or other operations connected with the completion of the work under this Contract.
- B. Whenever any notice is required to be given by the Owner or the Contractor to any adjoining

or adjacent land owner or other party before commencement of any work under this Contract, such notice shall be given by the Contractor.

- C. The Contractor shall indemnify the Owner and save it harmless from any damages on account of settlements or the loss of lateral or subjacent support of adjoining property and from all loss or expense and all damages for which the Owner may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.

1.10 EMERGENCIES

- A. Whenever the Contractor's work endangers the safety of life or property including adjoining property or property in the immediate proximity of the Project, the Contractor shall take all reasonable precautions to prevent threatened loss or injury therefrom.

1.11 EXISTING UTILITIES/FACILITIES - UNDERGROUND AND OVERHEAD

- A. The Contractor shall protect existing utilities/facilities, both overhead and underground as provided in Section 02760.

1.12 TEMPORARY FENCE

- A. The Contractor shall be responsible for the erection of temporary fence as required to protect his own work area.
- B. The Contractor shall be responsible for erection and maintenance of temporary fencing or other facilities as required to retain livestock and/or periodic security of existing fenced areas.
- C. Temporary fencing on facilities shall remain in place until the permanent fencing, as originally installed, is replaced under the restoration requirements of the Contract or as shown on the Contract Drawings.

* * * END OF SECTION * * *

SECTION 01560

TEMPORARY CONTROLS

1.0 GENERAL

- A. The contractor shall comply with all the provisions of the WPCP Prepared in March 2003. See Attachment in contract documents.

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Summary of Work: Section 01010
- B. Project Coordination: Section 01041
- C. Job Site Administration: Section 01043
- D. Protection of Work and Property: Section 01545
- E. Traffic Regulation: Section 01570
- F. Landscape Restoration: Section 02980

1.2 LAWS

- A. Requirements of federal, state and local statutes and regulations dealing with temporary controls described in this section shall be strictly adhered to by the Contractor.

1.3 CONSTRUCTION CLEANING

- A. The Contractor shall keep the site of the work and other areas used by him in a neat and clean condition, and free from any accumulation of rubbish.
- B. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the work site, and shall establish regular intervals of collection and disposal of such materials and waste.
- C. Keep his haul roads free from dirt, rubbish, and unnecessary obstructions resulting from his operations.
- D. Equipment and material storage shall be confined to areas approved by the Engineer.
- E. Disposal of all rubbish and surplus materials shall be off the site of construction, at the Contractor's expense, all in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws.

1.4 AIR POLLUTION CONTROL

- A. The Contractor shall not discharge smoke, dust or other contaminants into the atmosphere that violate the regulations of any legally constituted authority.
- B. The Contractor shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent his operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity.
- C. The Contractor shall comply with specific requirements of air quality control laws.
- D. The Contractor shall be responsible for any damage resulting from any dust originating from his operations.
- E. The dust abatement measures shall be continued until the Contractor is relieved of further responsibility by the Owner.

1.5 EROSION CONTROL

- A. Contractor shall provide temporary erosion control work shown in the plans, required by state or local agencies during the life of the contract. This work is intended to provide prevention, control, and abatement of water pollution/erosion within the limits of the project, and to minimize damage to the work, adjacent property, streams, and other bodies of water.
- B. The Contractor shall coordinate this temporary water pollution/erosion control work with the permanent drainage and erosion control work that may be specified in the Contract to the extent practicable to ensure that effective and continuous water pollution/erosion control is maintained during the construction of the Project.
- C. Clearing and grubbing operations shall be so scheduled and performed that grading operations and permanent erosion control features can follow immediately. If the project conditions do not permit this scheduling, temporary water pollution/erosion control measures will be required between successive construction stages.
- D. The area of excavation, borrow, and embankment operations in progress will be limited commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other permanent erosion control measures current according to the accepted schedule.
- E. If the Engineer determines that water pollution and/or erosion could occur due to seasonal limitations, the nature of the material, or the Contractor's progress, temporary water pollution/erosion control measures shall be taken immediately.
- F. The Engineer may require the Contractor's operations to be scheduled so that permanent erosion control features will be installed concurrently with or immediately following grading operations.

- G. Compliance with the requirements of this section shall not relieve the Contractor from his responsibility to comply with other provisions of the contract.

1.6 NOISE CONTROL

- A. Comply with state and local requirements as to allowable noise levels during construction.
- B. Equip all internal combustion engines in vehicles and construction equipment with effective mufflers.
- C. Prevent noise disturbance to adjoining property owners and the public.
- D. Construction operations shall be restricted between the hours of 7:00 AM and 10:00 PM without specific approval by the Owner except in emergencies.

1.7 SANITARY PROVISIONS

- A. The Contractor shall provide and maintain in a neat and sanitary condition such accommodations for the use of his employees and the Engineer as may be necessary to comply with the requirements and regulations of the agencies or organizations having jurisdiction over sanitary and health conditions and of other bodies or offices having jurisdiction thereover. He shall permit no public nuisances.
- B. The Contractor shall establish a regular daily collection of all sanitary and organic wastes.
- C. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of away from the site in a manner satisfactory to the Owner and in accordance with all laws and regulations pertaining thereto.

1.8 CHEMICALS

- A. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture.
- B. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.

1.9 PROVISION FOR WATER COURSES

- A. The Contractor shall provide for the flow of all water courses, sewers or drains, intercepted or disturbed by the Contractor during the progress of the work, and shall replace the same in as good condition as he found them or shall make such final provisions for them as necessary.

- B. The Contractor shall not obstruct the gutter of any street, but shall use all proper measures to provide for the free passage of surface water.
- C. The Contractor shall make provisions to take care of all surplus water, mud, silt, or other runoff pumped from excavations or resulting from sluicing or other operations, and shall be responsible for any damage, of whatever nature, resulting from his failure so to provide.
- D. No direct payment shall be allowed for the above work. Payment for the cost thereof shall be included in the prices bid for the various items which comprise the improvement.
- E. All work adjacent to or in the vicinity of streams, lakes, or such other water courses shall be accomplished in accordance with the requirements of the Departments having jurisdiction.

1.10 FISHERIES PERMIT

- A. All construction work in the vicinity of existing creeks, rivers and lakes shall be subject to the provisions of state regulations.
- B. A copy of any applicable permit is available at the office of the Owner for examination by bidders.
- C. The Contractor shall conform to the requirements of the permits issued for this project.
- D. Each Contractor shall secure separate approval from the Department of Fisheries concerning his proposed construction methods, operation and scheduling which will affect the waterways or lakes, and shall conform to the requirements of these departments to preserve the aquatic resources. The authorized representatives of the Department of Fisheries shall be the sole judges as to the effect of the Contractor's operations on the aquatic life in the streams and waterways.
- E. In the event said Department waives jurisdiction or does not approve the Contractor's method of operations, the Contractor shall secure written notice to that effect prior to construction.
- F. The Contractor may be held liable for any damage to fish life or habitat which results from failure to comply with the provisions of this section.

1.11 ARCHAEOLOGICAL OR CULTURAL RESOURCES

- A. The Contractor is advised that construction work within this Contract is subject to the provisions of state and federal laws and regulations pertaining to the preservation of archaeological and cultural resources.
- B. In the event that any archaeological or cultural resources are uncovered during the course of construction, all work shall cease until an inspection and evaluation of the site has been made by an archaeologist to insure that archaeological data are properly preserved. The Contractor shall notify the Owner who will in turn notify the proper authorities.

- C. The Contractor should anticipate reasonable delays while the archaeological investigations are being made and should make allowance for these delays under the appropriate bid items. No additional compensation will be allowed.

* * * END OF SECTION * * *

SECTION 01570

TRAFFIC REGULATION

1.0 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Access and Haul Roads: Section 01550

1.2 MATERIALS AND CONTRACT

A. Signs, warnings, light signals, bypass layouts, scheduling and routes shall conform to the requirements of U.S. Department of Transportation Federal Highway Administration "Manual on Uniform Traffic Control Devices", latest edition, as amended by local or state agency.

1.3 MAINTENANCE OF TRAFFIC

- A. The Contractor shall conduct his work so as to interfere as little as possible with public travel, and shall at his own expense provide and maintain suitable bridges, detours, or other temporary facilities for the accommodation of public or private travel including mail delivery, and shall give reasonable notice to the owners of private drives before interfering with them; provided, however, that such maintenance of traffic will not be required where the Contractor has obtained permission from the owners or tenants of private property, or the proper public authority, or both, to obstruct traffic within the said limits and time agreed upon.
- B. Access for fire fighting equipment, police and ambulance services shall be provided at all times and the Contractor shall keep the local authorities informed at all times of the location of construction operations and fire lanes.
- C. The Contractor shall also notify the authorities in charge of any municipal, private, or school transportation systems at least 48 hours in advance, of road closures that will force a change in the regular routing of the transportation system. The Contractor shall also provide maintain suitable detour routes for the system.
- D. Highway and arterial crossings shall be made in such a way that no more than half of the roadway is closed to traffic at any time, except where suitable detours or other arrangements are agreed to by the agency having jurisdiction.

1.4 COMPLIANCE WITH LOCAL REQUIREMENTS

- A. The Contractor shall comply with all applicable state and local requirements for closure of streets.
- B. He shall provide barriers, guards, lights, signs, temporary bridges, flagmen and watchmen, advising the public of detours and construction hazards.
- C. He shall also be responsible for compliance with additional public safety requirements which may arise during construction.
- D. He shall furnish and install, and upon completion of the work, promptly remove all temporary signs and warning devices.

1.5 TRAFFIC CONTROL PLAN

- A. Not less than ten days before beginning construction, the Contractor shall prepare and submit a general construction traffic control plan for the entire project, showing how detour routes will be signed and controlled.
- B. The traffic control plan shall include and make provision for at least the following items:
 - 1. Maintain at least one lane of traffic during construction in all streets and roads wherever possible.
 - 2. Employ flagpersons to direct traffic as required to assure safe vehicular traffic.
 - 3. Provide for the protection of pedestrians at all times.
 - 4. Provide, install, and maintain all signs, barricades, posts, guards, and notices whenever a street must be completely closed.
 - 5. Provide for passage of local vehicles to businesses and homes.
 - 6. Provide for passage and access of emergency vehicles, police, fire, and disaster units at all times. Assume liability for any damages resulting from failure to provide said access.
 - 7. Revise and update specific traffic control plan to reflect changes in the project schedule as required by the Owner.

1.6 STORAGE OF MATERIALS AND EQUIPMENT

- A. Materials or equipment shall not be stored where it will interfere with the free and safe passage of public traffic.
- B. The Contractor shall remove all equipment and other obstructions from that portion of the roadway to be opened for use by public traffic at the end of each day's work and at other times when construction operations are suspended for any reason.
- C. Materials or other obstructions shall not be placed within 20 feet of fire hydrants, which shall at all times be readily accessible to the fire department, nor within ten feet of United States mailboxes.

1.7 MAINTENANCE OF POSTAL SERVICE

- A. The Contractor shall be responsible for determining and complying with the United States Postal Department's requirements for maintaining postal service within the project area and along related detour routes.
- B. Where required by street closures or excessive interferences, the Contractor shall move mailboxes to temporary locations designated by the postal service and, when such closures are terminated, shall return the mailboxes to locations and conditions satisfactory to the owners and the postal service.

- C. Other mailboxes removed or damaged by the Contractor shall be placed to the satisfaction of the owners and the postal service within 24 hours of their removal or damage.

*** END OF SECTION ***

SECTION 01600

MATERIAL AND EQUIPMENT

1.0 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Project Coordination: Section 01041

B. Shop Drawings, Project Data, Samples: Section 01340

1.2 PRODUCTS LIST

A. As soon as possible but not more than thirty (30) days after date of Notice to Proceed, submit to Engineer five (5) copies of complete list of all products which are proposed for installation as substitutions or product options.

B. Tabulate list by each specification section.

1.3 CONTRACTOR'S OPTIONS

A. Unless otherwise specifically provided, all workmanship, equipment, materials and articles incorporated in the work covered by the Contract are to be new and of the best available grade of their respective kinds.

B. For products specified only by reference standards, select any product meeting standards, by any manufacturer.

C. For products specified by naming one or more products, but indicating the option of selecting equivalent products by stating "or equivalent" after specified product, Contractor must submit request, as required for substitution, for any product not specifically named.

D. For products specified by naming only one product and manufacturer, there is no option, and no substitution will be allowed.

1.4 SUBSTITUTIONS

A. Within thirty (30) days after Notice to Proceed, Engineer will consider formal requests from Contractor for substitution of products in place of those specified.

B. Submit request for substitution in accordance with requirements for submittal of shop drawings (Section 01340) and the following additional requirements.

1. For construction methods:

a. Detailed description of proposed method.

b. Drawings illustrating methods.

2. Itemized comparison of proposed substitution with product or method specification.

3. Data relating to changes in construction schedule.
4. Accurate cost data on proposed substitution in comparison with product or method specified.

C. In making request for substitution, Contractor represents:

1. He has personally investigated proposed product or method, and determined that it is equivalent or superior in all respects to that specified.
2. He will provide the same guarantee for substitution as for product or method specified.
3. He will coordinate installation of accepted substitution into work, making such changes as may be required for work to be complete in all respects.
4. He waives all claims for additional costs related to substitution which consequently becomes apparent.
5. Cost data is complete and includes all related costs under his Contract, but excludes costs under separate contracts and Engineer's redesign costs. Contractor agrees to pay for all costs under separate contracts and Engineer's redesign costs.

D. Substitutions will not be considered if:

1. They are indicated or implied on shop drawings or project data submittals without formal request submitted in accord with Section 01340.
2. Acceptance will require substantial revision of Contract Documents.

- E. The above shall not be construed to mean that any substitution for materials and equipment will be allowed. The Engineer reserves the right to reject and disapprove any request he deems irregular or not in the interest of the Owner.

1.5 MATERIAL CERTIFICATION

- A. Upon request of the Engineer, the Contractor's material suppliers may be required to furnish a certification from a recognized testing laboratory, certifying that the material supplied is in full conformance with the Contract Documents.

1.6 ADDITIONAL ENGINEERING COSTS

- A. Additional engineering costs accruing as a result of checking and/or redesign of substitutions will be charged to the Contractor and billed by the Owner at the Engineer's current established rates.

1.7 INSTALLATION

- A. All materials, appliances, fixtures, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with such instructions as are commonly furnished by the manufacturers, unless herein specified to the contrary.
- B. The Contractor shall use experienced millwrights, acceptable to the Engineer, in the installation and aligning of the equipment.
- C. At least one copy of the installation instructions shall be furnished to the Engineer no later than four days after the equipment arrives on site.
- D. Manufacturers' instructions for handling, protecting, installation, lubrication and alignments of the equipment, shall be followed to the letter and these installation instructions shall be considered a part of this Contract, with attendant penalties for insufficient performance.
- E. No piping or valves shall be supported by means of its connection to any mechanical equipment. Pipe connections to equipment must be disconnected upon request to permit inspection and determination that the piping is not transmitting stresses to the equipment.
- F. All motor flexible couplings shall be disconnected and checked with an indicator for misalignment after all other installation work has been completed unless the equipment installation instructions specifically prohibit this.
- G. The Contractor must allow a representative of the Owner to observe the indicator readings and approve or disapprove prior to recoupling.

1.8 PUMPS AND PIPING

- A. All pump and piping installations shall fully meet the standards of the Hydraulic Institute.

* * * END OF SECTION * * *

SECTION 01650

TESTING, STARTUP AND OPERATION

1.0 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Testing Laboratory Services: Section 01410
- B. Inspection Services: Section 01420
- C. Temporary Water: Section 01515
- D. Contract Closeout: Section 01700

1.2 RESPONSIBILITY

- A. Testing, startup and operation shall not be cause for claims for delay by the Contractor and all expenses accruing therefrom, shall be deemed to be incidental to the Contract.
- B. The Contractor shall provide all materials, supplies and labor necessary to efficiently complete the testing, startup and operation.
- C. All power and utility bills shall be paid by the Contractor up to and including the day of final acceptance of the Contract by the Owner. If not paid, these charges shall be treated as claims against the Contractor.
- D. If the Owner chooses to commence operations prior to final acceptance, the Owner will assume payment of all power and utility charges effective the day that operation is assumed by the Owner and notice is given in writing.

1.3 SCHEDULE

- A. Placing all phases of the project in service shall consist of three parts: testing, starting and operations.
- B. Not less than thirty (30) days before anticipated time for beginning the testing, the Contractor will submit to the Engineer for approval, a complete plan for:
 - 1. Schedules for tests.
 - 2. Detail schedules of procedures for startup.
 - 3. Complete schedule of events to be accomplished during startup.
 - 4. Schedule operator training as specified.
 - 5. An outline of work remaining under the Contract that will be carried out concurrently with the operation phases.

- C. Notify the Engineer of the approximate date that water or sewage will be required for operation.

1.4 TESTING

- A. Testing shall consist of individual tests and checks made on equipment intended to provide proof of performance of units and proper operation of unit controls together with such necessary tests whether or not described elsewhere in these Specifications to assure proper alignment, size, condition, capability, strength, proper adjustment, lubrication, pressure, hydraulic tests, leakage tests and all other checks deemed necessary by the Engineer to determine that all materials and equipment are of specified quality, properly situated, anchored and in all respects ready for use.
- B. All gravity sewer pipe and pressure piping shall be tested as required by these specifications and applicable codes.
- C. Tests on individual items of equipment, pipelines, vessels, structures, tanks, controls and other items shall be as described in various sections describing such items.
- D. Testing will be done by the Contractor in the presence of an Inspector designated by the Engineer. Records of all official tests will be made by the Inspector.
- E. During tests, the Contractor shall correct any defective work discovered or that is not in first class operating condition.

1.5 STARTUP

- A. This section not used

1.6 OPERATION

- A. This section not used

* * * END OF SECTION * * *

SECTION 01700

PROJECT CLOSEOUT

1.0 GENERAL

A. RELATED REQUIREMENTS SPECIFIED ELSEWHERE

1. Construction Facilities and Temporary Controls: Section 01500

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Adjusting.
- D. Project record documents.
- E. Operation and maintenance data.
- F. Warranties.
- G. Spare parts and maintenance materials.

1.2 CLOSEOUT PROCEDURES

- A. No later than 10 days prior to project completion, submit Notice of Substantial Completion to Engineer. Attach to the Notice a list of items yet to be completed and all Work not in accordance with the requirements of the Contract Documents. Schedule an inspection of the Work by Engineer to confirm Substantial Completion.
- B. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's review.
- C. Provide submittals to Engineer that are required by governing or other authorities.

1.3 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- C. Replace filters in operating equipment.

- D. Clean site; sweep paved areas, rake clean landscaped surfaces.
- E. Remove waste and surplus materials, rubbish and construction facilities and surplus materials from the site.
- F. Restore damaged landscaped areas to original conditions.

1.4 ADJUSTING

- A. Adjust moving systems and operating equipment to ensure smooth and unhindered operation through full range of motion.

1.5 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by URS.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual Products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions to alternates utilized.
 - 3. Changes made by addenda and modifications.
- F. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

3. Field changes of dimension and detail.
 4. Details not on original Contract drawings.
- G. As-built drawings shall be submitted to Engineer for review and approval. After approval, the Contractor shall incorporate changes and submit one mylar reproducible and one blueline set of as-builts drawings to Engineer.

1.6 OPERATION AND MAINTENANCE DATA

- A. Submit data bound in 8-1/2 x 11 inch text pages, in 3-ring binders not larger than 3 inches in size with durable plastic covers.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Contents: Prepare a table of Contents for each volume, with each Product or system description identified, typed on 30 pound white paper, in three parts as follows:
 1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
 2. Part 2: Operation and maintenance instructions, arranged by system. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Certificates.
- E. Submit 2 draft copies of completed volumes 15 days prior to final inspection. This copy will be reviewed and returned with Engineer comments. Revise content of all document sets as required prior to final submission.

F. Submit three sets of revised final volumes, within 10 days after final inspection.

1.7 WARRANTIES

A. Provide duplicate notarized copies.

B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

C. Provide Table of Contents and assemble in 3-ring binder with durable plastic cover.

D. Submit prior to final Application for Payment.

E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period,

1.8 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.

B. Deliver to project site and place in location as directed; obtain receipt prior to final payment.

2.0 PRODUCTS

NOT USED

3.0 EXECUTION

NOT USED

END OF SECTION

SECTION 01710

FINAL CLEANING

1.0 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Summary of Work: Section 01010
- B. Project Coordination: Section 01041
- C. Cutting and Patching: Section 01045
- D. Temporary Controls: Section 01560
- E. Contract Closeout: Section 01700
- F. Cleaning for Specific Products or Work: Specification Section for that Work

1.2 GENERAL REQUIREMENTS

- A. Maintain premises and public properties free from accumulations of waste, debris, and rubbish caused by operations.
- B. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave project clean and ready for occupancy.
- C. Pipeline and work on public rights-of-way shall be kept cleaned up as specified in Division 2 for the work involved.

1.3 SAFETY REQUIREMENTS

- A. Standards: Maintain project in accord with the applicable federal, state and local safety standards.
- B. Hazards Control:
 - 1. Store volatile wastes in covered metal containers, and remove from premises daily.
 - 2. Prevent accumulation of wastes which create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws:

1. Do not burn or bury rubbish and waste materials on project site unless approved by local fire and air pollution authorities.
2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
3. Do not dispose of wastes into streams or waterways.

2.0 PRODUCTS

2.1 MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

3.0 EXECUTION

3.1 DURING CONSTRUCTION

- A. Execute cleaning to insure that grounds and public properties are maintained free from accumulations of waste materials and rubbish.
- B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
- C. Remove waste materials, debris and rubbish from site and legally dispose of at public or private dumping areas off Owner's property.
- D. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

3.2 FINAL CLEANING OF STRUCTURES

- A. Employ experienced workmen, or professional cleaners, for final cleaning.
- B. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.
- C. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to shine finish.
- D. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.
- E. Broom clean paved surfaces; rake clean other surfaces of grounds.
- F. Clean windows.
- G. Replace air conditioning filters if units were operated during construction.

H. Clean ducts, blowers and coils, if air conditioning units were operated without filters during construction.

I. Maintain cleaning until project is occupied by Owner.

3.3 FINAL CLEANUP OF PIPELINES

J. Final cleanup work shall be completed as closely behind the construction work as it is physically possible to do.

K. Unless otherwise specifically provided in writing only those portions of the completed work will be included in the partial pay estimates where, in the Engineer's opinion, the cleanup work has been satisfactorily completed.

L. Refer to specific sections for detail requirements for cleanup of pipelines.

3.4 GENERAL CLEANUP

M. Before final acceptance, the Contractor shall remove and obliterate, insofar as feasible, all objects or disturbances of the ground which mar the landscape and were caused by his operations, whether or not part of the improvement.

N. Rubbish, excess materials, temporary structures, and discarded equipment shall be removed and disposed of.

O. Temporary haul roads shall be scarified and bladed to blend with surroundings.

P. Remove snags, down trees, brush, and stumps.

Q. Fill holes and grade to smooth land contours. Shape ends of cuts and fills to fit adjacent terrain.

R. Hand rake disturbed areas to remove loose objects including rock and clods in excess of two inches in any dimension.

S. Sweep pavement, curb and gutter, sidewalks and driveways.

*** END OF SECTION ***

SECTION 01720

PROJECT RECORD DOCUMENTS

1.0 GENERAL

A. RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- 1) Project Coordination: Section 01041
- 2) Operation and Maintenance Data: Section 01730

1.1 MAINTENANCE OF DOCUMENTS

A. Maintain at job site, one copy of :

- 1) Contract Drawings.
- 2) Project Manual.
- 3) Addenda.
- 4) Reviewed Shop Drawings
- 5) Change Orders
- 6) Other Modifications to Contract.
- 7) Field Test Records.
- 8) Maintenance Data Delivered with Equipment.

B. Store documents in field office, apart from documents used for construction.

C. Provide files and racks for storage of documents.

D. Maintain documents in clean, dry, legible condition.

E. Do not use record documents for construction purposes.

F. Make documents available at all times for inspection by Engineer and Owner.

1.2 RECORDING

A. Do not permanently conceal any work until required information has been recorded.

B. Keep documents current.

C. Contract Drawings: Legibly mark to record actual construction:

- 1) Depths of various elements of foundation in relation to variances from plan.
- 2) Horizontal and vertical location of underground utilities and appurtenances and

references to permanent surface improvements.

- 3) Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
- 4) Field changes of dimension and detail.
- 5) Changes made by Change Order or Field Order.
- 6) Details not on original Contract Drawings.

D. Specifications and Addenda: Legibly mark up each Section to record:

- 1) Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
- 2) Changes made by Change Order or Field Order.
- 3) Other matters not originally specified.

E. Shop Drawings: Maintain as record documents: legibly annotate drawings to record changes made after review.

1.3 SUBMITTAL

A. At completion of project, deliver record documents to Engineer.

B. Accompany submittal with transmittal letter, in duplicate, signed by the Contractor, or his authorized representative.

2.0 PRODUCTS

NOT USED

3.0 EXECUTION

NOT USED

END OF SECTION

SECTION 02010

SUBSURFACE INVESTIGATION

1.0 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Job Site Administration: Section 01043
- B. Construction Photographs: Section 01380
- C. Inspection Services: Section 01420
- D. Dewatering: Section 02140
- E. Shoring: Section 02150

1.2 SOILS REPORTS

- A. Any data on soil and/or subsurface conditions shown in the Plans or Specifications is not to be taken as a representation, but is based on limited information and is at best only an opinion; consequently, such data cannot be considered precise or complete and there is no guarantee as to its completeness, accuracy, or precision.
- B. A copy of any available reports may be inspected at the office of the Engineer if so stated in section "Information Available to Bidders."
- C. These reports were obtained only for use by the Engineer in design and are not a part of the Contract Documents.
- D. Additional Investigation:
 - 1. Contractor should visit the site and acquaint himself with site conditions before submitting a bid and the submission of a bid will be prima facie evidence that he has done so.
 - 2. Prior to bidding, Contractor may make his own subsurface investigations to satisfy himself with site and subsurface conditions.

1.3 QUALITY ASSURANCE

- A. The Contractor shall readjust work performed that does not meet technical or design requirements.
- B. The Contractor shall make no deviations from the Contract Documents without specific and written approval of the Owner.

- C. The Contractor shall be responsible for obtaining approval from responsible agency or property owner before performing any exploratory excavations.

*** END OF SECTION ***

SECTION 02050

DEMOLITION

1.0 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Excavating, Backfilling and Compacting for Utilities: Section 02222
- B. Pavement Repair and Resurfacing: Section 02575

1.2 PROTECTION

- A. Streets, roads, adjacent property and other work to remain shall be protected throughout the work.
- B. Pavement may be cut only where authorized and only to the extent specified.
- C. Any material damaged by Contractor's operations shall be replaced with new material by the Contractor.

1.3 CUTTING PAVEMENT, CURBS AND WALKS

- A. Unless specified otherwise by the authority having control over the pavement, curbs and walks, cutting and replacement shall be as specified in Section 02575.

1.4 PRIVATE DRIVEWAYS, CULVERTS AND MISCELLANEOUS

- A. Pipe laying operations in certain areas may necessitate temporary removal of mail boxes, private driveways, drains, service lines, conduits, etc. to facilitate construction. In the event that the Contractor finds it necessary to remove the above mentioned items, it is to be understood that it will be his responsibility to restore these items in a manner equal to their original condition. The Contractor shall maintain adequate temporary provisions for domestic deliveries and utilities service and access to fire fighting equipment.
- B. The cost of the above described work shall be included in the price bid for pipe and no additional compensation shall be made to the Contractor.
- C. The Contractor shall make every effort to prevent blocking private driveways for more than a reasonable time and shall make such driveways immediately accessible on order of the Owner.

* * * END OF SECTION * * *

SECTION 02110

SITE CLEARING

1.0 GENERAL

1.1 SECTION INCLUDES

- A. Remove surface debris.
- B. Clear site of vegetation

1.2 RELATED SECTIONS

- A. Section 01500 - Construction Facilities and Temporary Controls
- B. Section - Rough Grading

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable code for disposal of debris. Burning debris on site will not be permitted.
- B. Coordinate clearing work with property owners and utility companies.

1.4 EXISTING CONDITIONS

- A. The Contractor shall determine the actual condition of the site as it affects this portion of work.

2.0 PRODUCTS

NOT USED

3.0 EXECUTION

3.1 PROTECTION

- A. Locate, identify, and protect utilities to remain from damage.
- B. Protect, trees, plant growth, and features designated to remain from damage.
- C. Protect bench marks and existing structures from damage or displacement.
- D. Site preparation shall not damage structures, landscaping, or vegetation to remain or adjacent to the site except as shown on the drawings.
- E. The Contractor shall repair or replace any damaged property at no additional expense to the Owner.

3.2 CLEARING AND REMOVAL

- A. Clear areas required for access to site and execution of work.
- B. Unless otherwise specified, Contractor shall remove from the site obstructions such as brush, tress, stumps, logs, roots, heavy sod, vegetation, rock and stones, larger than 6 inches in any dimension, broken or old concrete and pavement, debris, and structures where the completion of work requires their removal.

3.3 REMOVAL

- A. Material that is removed and is not to be incorporated in the work shall be disposed of off the site.
- B. Pavement: When portions of asphalt pavements and concrete pads are to be removed and later construction is to be connected, edges shall be saw cut, on a neat line at right angles to the curb face or joint.

3.4 UTILITY REFERENCE

- A. Where existing utilities interfere with the prosecution of the work, the Contractor shall relocate them as directed by the Construction Manager.

END OF SECTION

SECTION 02140

DEWATERING

1.0 GENERAL

- A. It is the contractors sole responsibility to determine if dewatering is needed to complete the work.

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Excavating, Backfilling and Compaction for Utilities: Section 02222

1.2 QUALITY CONTROL

- A. It shall be the sole responsibility of the Contractor to control the rate and effect of the dewatering in such a manner as to avoid all objectionable settlement and subsidence.
- B. The Contractor shall employ an independent qualified Professional Engineer with experience in similar dewatering problems to review and approve the Contractor's proposed method of dewatering and to at least weekly, inspect the Contractor's operations and provide a report to the Engineer.
- C. All dewatering operations shall be adequate to assure the integrity of the finished project and shall be the responsibility of the Contractor.
- D. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, reference points should be established and observed at frequent intervals to detect any settlement which may develop. Should significant settlement be observed, recharge wells could be placed between the structure and the trench and water pumped under pressure back into the soil.
- E. The responsibility for conducting the dewatering operation in a manner which will protect adjacent structures and facilities rests solely with the Contractor. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the Contractor.

2.0 PRODUCTS

2.1 EQUIPMENT

- A. Before operations begin, the Contractor shall have available on the site of work sufficient pumping equipment and/or other machinery to assure that the operation of the dewatering system can be maintained.

3.0 EXECUTION

3.1 METHODS

- A. Dewatering shall be done by such method as the Contractor may elect.
- B. Dewatering, sufficient to maintain the groundwater level at or below the surface of trench bottom, base of the bedding course or foundation, shall be accomplished prior to pipe laying and jointing, if not prior to excavation and placing of the bedding as called for in other sections of the Specifications. The dewatering operation, however accomplished, shall be carried out so that it does not destroy or weaken the strength of the soil under or alongside the trench.
- C. The normal water table shall be restored to its natural level in such a manner as to not disturb the pipe and its foundation.
- D. If well points or wells are used, they shall be adequately spaced to provide the necessary dewatering and shall be sandpacked and/or other means used to prevent pumping of fine sands or silts from the subsurface. A continual check by the Contractor shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation.
- E. Dewatering of the trench shall be considered as incidental to the construction and all costs thereof shall be included in various unit contract prices in the Bid Form.
- F. Dispose of water so as not to cause injury to public or private property or to cause a nuisance or menace to the public and in accordance with the requirements of regulatory agencies.
- G. Construction of temporary facilities to dispose of water shall be incidental to the construction.
- H. Permanent piping systems shall not be incorporated in the dewatering system.

*** END OF SECTION ***

SECTION 02150

SHORING

1.0 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

A. Excavating, Backfilling and Compacting for Utilities: Section 02222

1.2 QUALITY ASSURANCE

A. The contractor shall be responsible for designing the shoring structure for the jacking and receiving pits. The design shall include calculations and drawings. The shoring design shall be stamped and signed by a structural engineer that is licensed in the State of California.

2.0 PRODUCTS

2.1 TRENCHES

A. Materials used shall be at the Contractor's option.

3.0 EXECUTION

3.1 SAFETY REQUIREMENTS

A. Shoring shall be placed in accordance with federal, state and local safety requirements.

3.2 CRIBBING AND SHEETING

- A. Unless otherwise provided, the Contractor shall provide all cribbing and sheeting needed to protect the work, adjacent property and improvements, utilities, pavement, etc., and to provide safe working conditions in the trench.
- B. Removal of any or all cribbing and sheeting from the trench shall be accomplished in such a manner as to fulfill all of the above requirements and shall also be accomplished in such a manner as to prevent any damage to the work.
- C. Damages resulting from improper cribbing or from failure to crib shall be the sole responsibility of the Contractor.
- D. Cribbing will not be a pay item and the cost thereof shall be included in the contract price for each of the various items of work included in the project unless otherwise provided.
- E. Cribbing and sheeting shall be removed. The removal of sheet piling, sheeting or cribbing used in trench or structure excavation shall be accomplished in the manner as to prevent the settlement of the pipes or other work and to prevent increased backfill loading which might overload the pipe or walls of the structure.

- F. Should the Owner order that any sheeting or cribbing be left in place, the Contractor shall not remove the same but will receive payment for the materials left in place on a unit price basis if a unit price is in the Contract or at the market value thereof if there is no such unit price.

3.3 SPECIAL REQUIREMENT FOR FLEXIBLE PIPE

- A. Shoring to be removed, or moveable trench shields or boxes, shall be located at least 2-1/2 pipe diameters away from the pipe if the bottom of the shoring, shield or box extends below the top of flexible pipe, unless a satisfactory means of reconsolidating the bedding or side support material disturbed by shoring removal can be demonstrated.
- B. Damages resulting from improper shoring or failure to shore shall be the sole responsibility of the Contractor.

*** END OF SECTION ***

SECTION 02222

EXCAVATING, BACKFILLING AND COMPACTING FOR UTILITIES

1.0 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Demolition: Section 02050
- B. Pavement Repair and Resurfacing: Section 02575
- C. Water Lines: Section 02660
- D. Existing Utilities/Facilities-Underground and Overhead: Section 02760

1.2 CLASSIFICATION

- A. All excavation is unclassified unless separate bid item is included in bid form.
- B. The terms earthwork or excavation include all materials excavated or removed regardless of material characteristics.
- C. The Contractor shall make his own estimate of the kind and extent of materials which will be encountered in the excavation.

1.3 QUALITY CONTROL ASSURANCE

- A. Soils and Backfill: Moisture density standard ASTM D1557 or AASHTO T-180 method unless otherwise specifically approved.
- B. In-place Density Determination: Sandcone method ASTM D1556 or Nuclear method ASTM D2922.
- C. Classification of Soils: ASTM D2487.
- D. Quality control monitoring of subgrade backfill and embankment materials and construction by certified independent laboratory approved by Engineer and secured and paid for by the Contractor.

1.4 SUBMITTALS

- A. Import backfill gradation and moisture density compaction curve test reports.
- B. Embankment and native backfill materials gradations and moisture density standards curve test reports.

C. Certification of gradation and compliance with referenced standards and moisture density standards test reports.

D. Density test results in approved format.

E. At any time the Contractor shall change the source and/or stockpile from which materials are obtained, certificates of gradation for these new sources will also be required. The Contractor shall make allowances in his unit prices bid for these items to cover expenses incurred in having this certification made and no additional compensation will be allowed.

F. During construction, the Owner may elect to have further gradation testing completed on the materials being furnished by the Contractor. This testing will be at the expense of the Owner, however, the Contractor shall provide material samples as may be necessary to complete this testing and these material samples will be furnished from material available on the job site or from the Contractor's source and/or supplier.

2.0 PRODUCTS

2.1 BACKFILL MATERIALS

A. Native materials are acceptable if they meet the specifications.

2.2 GRAVEL BEDDING MATERIAL

A. Bedding for Rigid Conduits: Bedding material shall consist of clean, granular, well graded screened or crushed sand and gravel material conforming to the following gradation when tested in accordance with ASTM D422:

Sieve Size	Percent Passing
<u>Square Opening</u>	<u>By Weight</u>
3/4 inch	100
3/8 inch	95 - 100
No. 8	0 - 10
No. 200	0 - 3

- B. Bedding for Flexible Conduits: Bedding material shall be a clean screened or crushed sand/gravel mixture free from organic matter and conforming to the following gradation when tested in accordance with ASTM D422:

Sieve Size	Percent Passing
<u>Square Opening</u>	<u>By Weight</u>
3/4 inch	100
3/8 inch	70 - 100
No. 4	55 - 100
No. 10	35 - 95
No. 20	20 - 80
No. 40	10 - 55
No. 100	0 - 10
No. 200	0 - 3

- C. Minimum sand equivalent shall be 35 in accordance with ASTM D2419.

2.3 BACKFILL GRAVEL

- A. All backfill gravel to be furnished under this Contract shall consist of naturally occurring screened or crushed gravel.
- B. Be essentially free from wood waste or other extraneous or objectionable materials.
- C. Shall have such characteristics of size and shape that it will compact readily and shall meet the following test requirements:

Stabilometer "R" Value	72 min.
Swell Pressure	0.3 psi max.
Maximum Particle Size	3 in.
Passing 1/4" Sq. Opening	25% min.
Passing No. 200 Sieve	10% max.

All percentages are by weight

Dust Ratio: % Passing No. 200 Sieve

2/3 max.

% Passing No. 400 Sieve

Sand Equivalent (ASTM D2419)

30 min.

- D. Backfill gravel material retained on a 1/4-inch square sieve shall contain not more than 0.20% by weight of wood waste.
- E. The Contractor shall provide the Engineer with a certificate of gradation or sieve analysis from a qualified testing laboratory for backfill gravel furnished under this contract.
- F. Tallying for pay quantities shall be as established by the Contractor and Engineer prior to construction.

2.4

FOUNDATION GRAVEL

- A. At least two basic trench-bottom conditions commonly cause problems: (1) where silty soils or fine sandy soils are encountered, they will usually flow in the presence of a stream of water, and (2) where clays, peats, or other soft materials are encountered, they may become saturated with water, but do not usually break down into fine particles and flow as do the silts or sands mentioned above.
- B. Contractor's attention is called to conditions for use of the material as outlined in Article 3.5 of this section.
- C. Condition (1) Material: Where Condition (1) is encountered, the following foundation gravel has been found by experience usually to be adequate. Foundation gravel shall consist of clean bank run sand and gravel, free from dirt, roots, topsoil, and debris and contain not less than 35% retained on a 1/4-inch sieve and with all stones larger than two (2) inches removed. Such gravel must only be used in a dry-trench bottom, free from quicksand or running sand.
- D. Condition (2) Material: Where Condition (2) is encountered, Class A or Class B foundation gravel listed below, has been found by experience usually to be adequate. Other material may, however, be found more desirable by the Contractor:

Sieve Size	Class A	Class B
<u>Square Opening</u>	<u>% Passing</u>	<u>% Passing</u>
2-1/2"	98 - 100	95 - 100
2"	92 - 100	75 - 100
1-1/2"	72 - 87	30 - 60
1-1/4"	58 - 75	0 - 15

3/4"	27 - 47	0 - 1
3/8"	3 - 14	— —
No. 4	0 - 1	— —

- E. Foundation gravel shall contain no pieces larger than five (5) inches, measured along the line of greatest dimension.

3.0 EXECUTION

3.1 TRENCHING

- A. Material shall be excavated from trenches and piled adjacent to the trench and maintained so that the toe of the slope of the spoil material is at least two (2) feet from the edge of the trench.
- B. Material shall be piled in such a manner that will cause a minimum of inconvenience to public travel.
- C. Free access shall be provided to all fire hydrants, water valves and meters, and clearance shall be left to enable the free flow of storm water in all gutters, conduits, and natural watercourses.
- D. Ledge rock, boulders, or stones shall be removed to provide a minimum clearance of six (6) inches under and around the pipe.
- E. Contractor shall keep excavations free of water in accordance with Section 02140.
- F. Contractor is responsible for shoring in accordance with Section 02150.

3.2 TRENCHING FOR WATER LINES

- A. Trenches shall be dug to true and smooth bottom grades and in accordance with the lines given by the Engineer.
- B. Trench widths shall not exceed 30 inches maximum or 1.5 times outside diameter of the pipe plus 18 inches whichever is greater.
- C. Standard excavation equipment shall be adjusted so as to excavate the narrowest ditch possible.
- D. Depth of trenching for water mains shall be such as to give a minimum cover of 36 inches over the top of the pipe unless otherwise specified.
- E. Deeper excavation may be required due to localized breaks in grade, or to install the new main under existing culverts or other utilities where necessary.
- F. Where profile of pipeline and ground surface is shown on the Plans, pipeline shall be laid to elevation shown regardless of depth.

- G. Excavation shall be to such depth that the minimum cover over the valve nuts shall be one foot.
- H. The length of trench excavated in advance of pipe laying shall be kept to a minimum and in no case shall length of open trench exceed 200 feet unless specifically authorized by the Engineer
- I. Trenches shall be overexcavated below the specified grade to provide for bedding material specified.

3.3 PIPE FOUNDATIONS

- A. Where the trench bottom is in a material which is unsuitable for foundation or which will make it difficult to obtain uniform bearing for the pipe, such material shall be removed and a stable foundation provided in accordance with Standard Detail entitled "Foundation Gravel and Backfill".
- B. Proper preparation of foundation and placement of foundation material where required, shall precede the installation of all pipe. This shall include the necessary preparation of the native trench bottom and/or the top of the foundation material to a uniform grade so that the entire length of pipe rests firmly on a suitable properly compacted material.
- C. Gravel to be used for foundation purposes shall be of a type and gradation to provide a solid compact bedding in the trench. Since trench conditions vary, foundation gravel requirements will change.
- D. Neither approval or disapproval of the foundation material proposed by the Contractor shall relieve him of his responsibility for providing adequate pipe foundation and guaranteeing his work as elsewhere required by the Contract.
- E. Unsuitable material for foundation purposes below the depth required for the specified bedding shall be removed and replaced with suitable foundation gravel.
- F. Excavated materials shall be disposed of at an approved waste site and all costs involved in the excavating and wasting of this material shall be considered as incidental to the foundation item, except that excavation more than two (2) feet below the pipe invert shall be classified as extra excavation and paid for at the Extra Excavation unit bid price.

3.4 PIPE BEDDING

- A. Placement of bedding material in the pipe zone shall be as specified in the section regarding the pipeline being constructed. .

3.5 BACKFILLING

- A. Pipe bedding and backfill to 6 inches over the top of the pipe shall be completed before backfilling operations are started.
- B. The Contractor shall take all necessary precautions to protect the pipe from any damage, movement or shifting. In general, backfilling shall be performed by pushing the material from

the end of the trench into, along and directly over the pipe so that the material will be applied in the form of a rolling slope rather than by side filling which may damage the pipe. Backfilling from the sides of the trench will be permitted after sufficient material has first been carefully placed over the pipe to such a depth as to protect the pipe.

- C. Compaction equipment used above the pipe zone shall be of a type that does not injure the pipe.
- D. Provide for the proper maintenance of traffic flow and accessibility as may be necessary.
- E. Make adequate provisions for the safety of property and persons.
- F. Temporary cribbing, sheeting, or other timbering shall be removed unless specifically authorized in writing.
- G. Dewatering shall be continued until the trench is completely backfilled.
- H. Brush, stumps, logs, planking, disconnected drains, boulders, etc., shall be removed from the material to be used for backfilling the trench.
- I. Where original excavated material is unsuitable for trench backfill, backfill gravel shall be placed. The unsuitable material shall be removed to a disposal area. Backfill gravel shall be used for backfill only where original material is unsuitable and upon approval by the Engineer.
- J. Where it is required that a blanket of select material or bank run gravel be placed on top of the native backfill, the backfill shall be placed to the elevations shown on the Plans, or to the elevation the Engineer may direct, and shall be leveled to provide for a uniform thickness of the selected material. Compaction of the native material shall be as required by the Owner and shall be performed prior to placing the select material except where the backfill is settled by the jetting method. In this case, the bank run material shall be placed before jetting. The top layer of material shall be then loosened by scarifying or other method and recompact. Surface material shall be loosened to whatever depth is required to prevent bridging of the top layer, but shall in no case be less than 18 inches.
- K. Backfill Gravel: Wherever a trench is excavated in a paved roadway, sidewalk or other area where minor settlements would be detrimental and where the native excavated material is not suitable for compaction as backfill, the trench shall be backfilled to such depth as the Engineer may direct with Backfill Gravel.

3.6 GENERAL COMPACTION REQUIREMENTS

- A. Requirements of this section shall apply unless more stringent requirements are established by the local agency involved.
- B. When working in an existing traveled roadway, restoration and compaction must be achieved as the trench is backfilled so as to maintain traffic.
- C. Trench backfill under roadway shall be mechanically compacted to 90% of maximum density

except for the top 6-inches which shall be mechanically compacted to 95%.

- D. In any trench in which 95% density of the top 6-inches cannot be achieved with existing backfill, the top 6-inches shall be replaced with backfill gravel mechanically compacted to 95%.
- E. When working in areas outside of proposed traveled roadway or on easements, backfill compaction may be achieved throughout the entire depth of the trench either by mechanical compaction or by water settling. In any case where the fill cannot be brought to a visibly dry, firm, stabilized condition by water settling, all affected backfill shall be removed and replaced by backfill gravel mechanically compacted to 90% density.
- F. Bedding and backfill beneath all sanitary sewer services shall be compacted to 95% of maximum density.

3.7 MECHANICAL COMPACTION

- A. Method of compaction shall be at Contractor's option.
- B. The Contractor shall be responsible to provide the proper size and type of compaction equipment and select the proper method of utilizing said equipment to attain the required compaction density.
- C. In place compaction tests may be made. Contractor shall remove and recompact material that does not meet specified requirements.

*** END OF SECTION ***